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Effect of electroacupuncture (EA) on gastrointestinal peristalsis in dogs

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The digestive system is involved with several pathologies. Usually, the drugs used for management of GI disturbances produce side effects, such as bradycardia, antidopaminergic effects and colinomimetic effects. Acupuncture has been used to treat GI disturbances in animals and man. EA produced a vago-mediated reduction in the time of gastric emptying and increased gastric myoelectric complex in dogs. EA was more efficient than manual acupuncture to increase gastric contraction and pressure in dogs and false acupuncture had little effect. Faecal excretion rate of chromic oxide (CrO₂) is a non-invasive method to determine GI transit. This marker can be mixed to the animal's food without any stress and faeces collected in the floor without restraint. This study investigated the effect of ea on the GI transit, by determining the faecal excretion rate of CrO₂ in dogs. Five adult healthy dogs were used. EA was performed at their home and there was no change in amount and kind of food or management. CrO₂ (500 mg - capsule) was mixed to the food and given 2 hs before EA. All faeces were collected for 60 hs after the treatment. A dense disperse alternate current electrical stimulus was applied bilaterally for 30 mins (9 v, square wave, 5 Hz) in the following acupoints: Stomach 36 (lateral side of the leg, distal to the head of the tibia in a depression between the muscles cranial tibial and long digital extensor), Large Intestine 4 (between the insertion of the 1st and 2nd metacarpal bones) and Bladder 25 (lateral to the caudal border of the spinous process of the fifth lumbar vertebrae). The dogs were control of themselves, i.e. the same dogs underwent EA and sham (false) EA one week later in a randomised crossover study. False points were located 1 cm beside the real points. CrO₂ excretion was measured by colorimetry. Wilcoxon non-parametric test was used to investigate differences in chromic oxide excretion between the groups. Time of excretion of CrO₂ was 45 hs according to a pilot study in two dogs. The frequency of defecation was higher in the dogs submitted to EA (21) when compared to the control group (15). Total amount and mean excreted concentration of CrO₂ was also greater (p=0.03) in dogs undergoing EA (10,07% and 2.01±0.71%) than in those undergoing false EA (4.94% and 0.99±0.61%) respectively. Gastrointestinal motility is controlled by local mioenteric plexus and by reflexes from the stomach to pre-vertebral sympathetic ganglia, to spinal cord and to brain stem. Both neural and humoral factors are involved and acupuncture may act as viscerosomatic reflex involving both factors. The role of somato-visceral reflexes on the acupuncture effect in the GI tract was reported before. Efferent vagal gastric nerve activity is increased by stimulation of the pelvic limb and abolished by bilateral vagal, femoral or sciatic nerve section. The anatomical pathway of the Stomach meridian and the femoral and deep fibular nerves are the same, explaining the previous findings. Acupuncture-induced GI stimulation is a reflex phenomenon, with the afferent nervous pathway represented by muscle and cutaneous afferent nerves and the efferent pathway composed by the efferent vagal gastric nerve and its reflex center, with the participation of the CNS. The effect of acupuncture may also be mediated by humoral mechanisms, such as acetylcholine, serotonin and endogenous opioid release. Previous studies using ultrasonography and susceptometry showed that EA increased GI motility in dogs. This study using a long term assessment of GI motility, showed that EA increased long term GI motility in dogs and might be useful clinically for therapeutic purposes in cases of constipation.